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Presenting a Comprehensive Model for Portfolio Risk Premium Assessment and Explaining Its Economic Consequences

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ABSTRACT

This study aimed to present a model for portfolio risk premium assessment and explain its economic consequences for companies listed in Tehran stock Exchange. In order to achieve this purpose, monthly data of 150 companies listed in Tehran Stock Exchange during 2007-2017 was used. In this study, the predictive powers of Fama - French three-factor model (2011), Carhart four-factor model (2014), Fama - French five-factor model (2014), Brousseau five-factor model (2015) and Roy and Shijin six-factor model (2018 b) have been evaluated and then an optimal model has been developed for portfolio risk assessment. Findings showed that the Carhart four-factor model has higher predictive ability (48.3%) than other mentioned models in the Tehran Stock Exchange. The explanatory power and predictive ability of the model developed in the Tehran Stock Exchange was 55.7% indicating higher predictive ability respect to previous models on portfolio risk premium. Also, the economic consequences of portfolio risk premium showed that portfolio risk premium had a positive and significant effect on both absolute and relative buying and selling gap between proposed prices and stock returns synchronization.

Keywords: Portfolio Risk Premium, Fama-French Model, Carhart Model, Brousseau Model, Roy and Shijin Model.

1. Introduction

Standard pricing models are prospective and they use assumptions about investors' tastes and portfolio opportunities to predict how risk should be measured as well as to study the relationship between risk and expected return. In contrast, empirical models are also retrospective. In empirical models, investors' tastes and portfolio opportunities are included as patterns in average returns and proposed models take them into account.

From the introduction of the capital asset pricing model (CAPM), financial researchers have sought to test this model in order to measure its ability to explain investors' behavior in financial markets. Recent studies since the late 1970s include a series of studies done by financial researchers that challenge the predictions of CAPM. Fama and French (1993) provided evidence that Sharpe's capital asset pricing model (Sharpe, 1964) cannot explain the cross-sectional changes due to firm size, book to market ratio and mean stock returns, so they presented a three-factor model that considered the factors like firm size and the ratio of the book value to market value of equity in addition to the market factor. These effects are called the value effect and the size effect, respectively. Value effect means that the stock with higher book value to market value ratio trends to higher mean stock return respect to stock with lower book value to market value ratio. The size effect refers to decrease the mean return of company as the stock size increases. During next few years, financial researchers have identified many patterns that were inconsistent with the capital asset pricing model. Abnormalities such as the momentum factor by Jegadeesh & Titman (1993), accrual items by Sloan (1996), liquidity risk by Butler, Leone, and Willenborg (2004), special volatilities by Ang, Hodric, Xing, and Zhang (2006) quoted by Campbell, Hilscher, and Szilagyi (2008) and maximum daily return by Bali, Cakici and Whitelaw (2011) are examples of these abnormalities. Therefore, some abnormalities that have not been added to the three-factor model in the previous studies, were added to Fama and French three-factor model and Fama five-factor model in present research, and the explanatory power of each model to assess portfolio risk was evaluated and finally, the best model was selected.

Since no study has been conducted in Iran to provide a new model for assessment of portfolio risk premium and explaining its economic consequences during 2009-2015, current study has tried to present a model for assessing portfolio risk premium and explaining its economic consequences compatible with the Iranian reporting environment in Iran following researches of Fama and French (2014), Brousseau (2015) and Roy and Shijin (2018 b). Therefore, identifying a suitable model extracted from the results of current study and explaining its economic consequences can be very effective in the economic decisions made by various investors including actual and potential shareholders of companies to assess the accuracy of profit management predictions.

2. Literature Review

2.1. Theoretical Background

Investors feel that their capital is at risk when they are trading their assets in one or more types of securities expected to get return in the future so they consider another factor in addition to return called risk. Hence, in order to make a successful investment, it is necessary to pay attention to both risk and return factors at the same time. This complexity and sensitivity has emerged a variety of theories to quantify the relationship between stock price and the variables affecting them such as return and risk. In recent decades, one of the most important advances in financial theory is to discuss about risk in a measurable way. If it is clear how to accurately measure the financial risks of fair pricing, it will be properly possible to assess risky assets. This will increase the efficiency and optimal allocation of resources in the financial system. In other words, investors will be able to allocate their savings for risky stocks. On the other hand, managers can utilize capital resources of shareholders and creditors. Pricing of capital assets, especially stocks is one of the most important issues with which investors and activists are faced in the capital market during investing in these securities. Therefore, researchers are interested in predicting the expected returns while accurate pricing of stocks. Capital asset pricing model (CAPM) is a common method to price stock. The development of this model has been considered in the literature and scientific foundations of financial management.

In the research done by Sheri and Aghazarian (2007), it was found that stock risk premium with sensitivity of stock returns had a significant relation with the investment factor and profitability factor.

Also, the study of Islami Bidgoli and Shahsavani (2012) has investigated the difference in stock returns of different companies in comparison with predictions of Fama and French three-factor model and the results said that the risk interpretation of the beta coefficient has not been justified in Tehran Stock Exchange and the size premium and value premium are the consequences of higher risks taken by investors (Islami Bidgoli & Shahsavani, 2012).

2.2. The research purpose

The purpose of this study was to provide a model for assessing portfolio risk premium and explaining its economic consequences in the Tehran Stock Exchange.

3. Research methodology

3.1. Methods for collecting information and data

This research is applied in terms of purpose. Its plan is a quasi-experimental and ex-post facto research and it is done using historical information. Journals, books, as well as available databases have been used to collect information on the theoretical background of research. Also, the data needed for the analysis was extracted from the Rahnavardnovin software, the information of audited financial statements and the explanatory notes of the companies.

3.2. Statistical population, statistical sample and research temporal domain

According to spatial scope of the research, the statistical population includes all the companies accepted in the Tehran Stock Exchange whose stocks have been traded in the first market from 2007 to 2017. Finally, 150 companies have been selected as the statistical sample among all companies listed in the Tehran Stock Exchange.

3.3. Research models

3.3.1. Fama - French Three-Factor Model

Fama and French (Fama & French, 2011) have tried to justify the unusual reported observations using their three-factor model. They believed that if three-factor model is used instead of the Sharpe capital asset pricing model (Sharpe, 1964); many observations that are not explained with Sharpe model can be justified. The model provided by Fama and French is as follows:

$$R_i - R_f = b_i(R_m - R_f) + s_i(SML) + h_i\,(HML) + \varepsilon$$

where:

$R_m - R_f$ is market portfolio excess return relative to risk-free return rate. SML (Small Mines Large) is the difference between portfolio return of small size companies and the portfolio return of large size companies. HML (High Mined Low) is the difference between the portfolio return of stock with a large book value/market value ratio and the portfolio return of stock with a small book value/market value ratio. b_i, s_i and h_i are also return sensitivity respect to these factors.

3.3.2. Carhart Four-Factor Model

In their four-factor model, Carhart (2014), has added tendency for past performance factor to Fama-French three-factor model. The performance is evaluated based on the difference between the average portfolio returns of winning companies (companies with a tendency for high past performance) and average portfolio returns of losing companies (companies with a tendency for low past performance). In the Carhart (2014) model, the pattern used to test the research hypotheses is as follows: SMB, HML and WML variables represent size factor, value factor and momentum factor, respectively:

$$R_i - R_f = b_i\big(R_m - R_f\big) + s_i(SML) + h_i\,(HML) + r_i\,(WML) + \varepsilon$$

3.3.3. Fama - French Five-Factor Model

In The Fama - French five-factor model (Fama & French, 2014), SMB, HML, RMW and CMA variables represent size factor, value factor, profitability factor and investment pattern factor, respectively:

$$R_i - R_f = b_i\big(R_m - R_f\big) + s_i(SML) + h_i\,(HML) + r_i\,(RMW) + c_i\,(CMA) + \varepsilon$$

Where:

Portfolio (stock) excess return (Ri-Rf) is the additional return above and beyond the risk-free return obtained by an investor after buying the stock due to price changes or profit division during the retention period and known as portfolio (stock) risk premium.

Market excess return (Rm-Rf) is the additional return above and beyond the risk-free return obtained by an investor due to buying a market portfolio during the retention period and is known as market risk premium.

SMB factor indicates the difference between the average portfolio return of small size companies and the average portfolio return of large size companies.

HML factor indicates the difference between the average portfolio return of companies with a small B/M ratio and the average portfolio return of companies with a large B/M ratio.

RMW factor indicates the difference between the average portfolio return of companies with strong profitability and the average portfolio return of companies with low profitability.

CMA factor indicates the difference between the average portfolio return of companies with low investment volume and the average portfolio return of companies with high investment volume.

3.3.4. Brousseau Five-Factor Model

In Brousseau five-factor model (2015), SMB, HML, MKT, LIQ and AQF variables represent size factor, value factor, profitability factor, liquidity risk factor and the accounting quality factor, respectively:

$$R_i - R_f = b_i\left(R_m - R_f\right) + s_i(SML) + h_i\,(HML) + r_i\,(LIQ) + c_i\,(AQF) + \varepsilon$$

Liquidity Risk Factor (LIQ): A stock with high Amihud non-liquidity ratio experiences a large price change for a small trading volume. This ratio is obtained through dividing the absolute return by the trading volume during a certain period. This measure is calculated as an annually average value. If the amount of non-liquidity ratio is high, that stock has non-liquidity problem. It means that the stock price changes considerably against small trading volumes. This criterion is interpreted as the reaction of the daily stock price to the trading volume.

Accounting Quality Factor (AQF): To calculate the quality of financial reporting, the quality of accrual items was firstly calculated based on Mc Nichols's model (McNichols, 2002). Then, the absolute value of the residual error was considered as a representative of the quality of financial reporting. This criterion is based on the view that accrual items increase awareness of earning by decreasing the smoothing caused by changes in cash. AQF has been used in previous researches.

Accrual items quality: The accrual items quality is calculated based on the McNichols (2002) model. The McNichols (2002) model is as follows:

$$\frac{\Delta WC_{i,t}}{Assets_{i,t}} = \beta_{0,i} + \beta_{1,i}\frac{CFO_{i,t-1}}{Assets_{i,t}} + \beta_{2,i}\frac{CFO_{i,t}}{Assets_{i,t}} + \beta_{3,i}\frac{CFO_{i,t+1}}{Assets_{i,t}} + \beta_{4,i}\frac{\Delta sales_{i,t}}{Assets_{i,t}} + \beta_{5,i}\frac{PPE_{i,t}}{Assets_{i,t}} + V_{i,t}$$

Where $\Delta WC_{i,t}$ is the change in the working capital accounts of company i in year t calculated as follows:
Change in working capital accounts = increase in accounts receivable + increase in inventory
+ Decrease in accounts payable and debts + decrease in taxes payable + increase (decrease) in other assets (debts)
$Assets_{i,t}$: The average assets of company i in the year t
$CFO_{i,t-1}$: Cash received due to operations of company i in the year t-1
$CFO_{i,t}$: Cash received due to operations of company i in the year t
$CFO_{i,t+1}$: Cash received due to operations of company i in the year t+1
$\Delta sales_{i,t}$: Changes in the sales account of company i in the year t
$PPE_{i,t}$: Machinery and equipment property of the company i in the year t
$V_{i,t}$: Residual error

The value of the residual error in Eq. (5) indicates that the estimation error in the current accrual items is not related to the operating cash flow and it cannot be explained by changes in revenue and machinery and equipment. In present study, the absolute value of residual error is used as a representative for the quality of financial reporting.

3.3.5. Roy and Shijin Six -Factor Model

In Roy and Shijin six-factor model (Roy & Shijin, 2018a), LBR, Rm-Rf, SMB, HML, RMW and CMA variables indicate income growth factor, market risk

premium factor, size factor, value factor, profitability factor and investment factor, respectively:

$$R_i - R_f = b_i(R_m - R_f) + s_i(SML) + h_i\,(HML) + r_i\,(RMW) + c_i\,(CMA) + l_i\,(LBR) + \varepsilon \quad (6)$$

3.4. Variables of economic consequences of portfolio risk premium

3.4.1. Variables of consequence:

Stocks Liquidity: Liquidity is one of the desirable features of competitive markets. Liquidity is defined as the ability to trade quickly at low cost and without severely affecting prices, and is a key determinant of the viability of markets. This phenomenon is considered as the source of durability in futures markets and it is an important indicator to assess the efficiency and maturity of these markets (Yang & Zhang, 2009). Due to the multidimensional nature of liquidity, it is difficult to reflect its characteristics in one criterion, so following two criteria have been used for stocks liquidity:

1) Absolute buying and selling gap between proposed prices (ABS)
2) Relative buying and selling gap between proposed prices (RS)

Absolute buying and selling gap between proposed prices (ABS): This value is obtained from the difference between the buying and selling proposed prices:

$$ABS = PA - PB \quad (7)$$

Relative buying and selling gap between proposed prices (RS): This ratio is obtained by dividing the difference in buying and selling proposed prices to average proposed prices as Eq.(8):

$$RS = \frac{a_{i,t} - b_{i,t}}{(a_{i,t} + b_{i,t})/2} \quad (8)$$

Stock returns synchronization: To measure the stock returns synchronization, following the research done by Fraz (2017), firstly a regression model (Izadinia et al, 2014) is estimated using annually time series data for each company as monthly as follows (Eq.(9)):

$$RET_{i,\Theta}=\beta_0+\beta_1 MRET_{\Theta-1}+\beta_2 MRET_{\Theta}+\beta 3 IRET_{\Theta-1}+\beta_4 IRET_{\Theta}+\varepsilon_{i,} \quad (9)$$

Where:

$RET_{i,\Theta}$: Stock returns of the company in current month.

$MRET_{\Theta-1}$: Market returns in current month (market returns is obtained by dividing the difference between indices at the beginning of the period and at end of the period by the index at the beginning of the period.

$MRET_{\Theta}$: Market returns in the previous month.

$IRET_{\Theta-1}$ Industry returns of the company in the current month (Industry returns is obtained by dividing the difference between industry indices at the beginning of the period and at end of the period by the industry index at the beginning of the period).

$IRET_{\Theta}$: Industry returns in the previous month.

$\varepsilon_{i,\Theta}$: Regression model error.

Regression (Islami Bidgoli & Shahsavani, 2012) is estimated by the number of years -company for each year. Then, the stock returns synchronization is calculated using the coefficient of determination for the above model according to Eq. (10) as follows:

$$SYN_{i,t} = \ln(\frac{R^2_{i,t}}{1 - R^2_{i,t}}) \quad (10)$$

In Eq. (10), SYN is the stock returns synchronization of the company in current year and R^2 is the regression coefficient of determination (Islami Bidgoli & Shahsavani, 2012) for each company-year.

4. Results

4.1. Descriptive Statistics

Tables 1 and 2 present some concepts of descriptive statistics for variables including mean, median, minimum observations, maximum observations and standard deviations. According to Table.1, the results show that the mean portfolio risk premium is 0.0048 for the studied companies implying high volatility of portfolio risk premium due to high standard deviation (0.1053). The mean (0.058), minimum (-.0745) and maximum (0.1201) values of market risk premium variable with standard deviation of 0.557 show a high volatility of this variable.

Table 1: Descriptive statistics for variables used in the research (monthly data)

Name of Variable	Symbol of Variable	Number of Observations	Mean	Median	Maximum	Minimum	SD
Portfolio Risk Premium	R_i-R_f	19800	0.0048	-0.0141	0.2693	-0.1644	0.1053
Market Risk Premium	R_m-R_f	19800	0.0058	-0.0004	0.1201	-0.0745	00557
Size Factor	SMB	19800	0.0031	0.0033	0.0555	-0.0486	0.0275
Value Factor	HML	19800	-0.0229	-0.0207	0.0349	-0.0928	0.0343
Momentum Factor	WML	19800	0.0366	0.0339	0.1363	-0.0336	0.0415
Investment Factor	CMA	19800	-0.0229	-0.0234	0.0365	-0.0863	0.0326
Profitability Factor	RMW	19800	-0.0229	-0.0203	0.0515	-0.0926	0.0356
Liquidity Risk Factor	LIQ	19800	0.0085	0.0099	0.0665	-0.0527	0.0306
Accounting Quality Factor	AQF	19800	0.0118	0.0084	0.0592	-0.0246	0.0223
Monthly Income Growth Factor	LBR	19800	-0.00044	-0.0046	0.0334	-0.0603	0.0244

According to Table (2), for instance, the mean relative buying and selling gap between proposed prices is 0.0227 indicating relatively low volatility due to the standard deviation of 0.0119.

Table (2): Descriptive statistics for variables used in the research (annually data)

Name of Variable	Symbol of Variable	Number of Observations	Mean	Median	Maximum	Minimum	SD
Portfolio Risk Premium	R_i-R_f	1650	0.1083	0.0188	0.9449	-0.4790	0.446
Absolute Buying and Selling Gap between Proposed Prices	ABSP	1650	110.57	75.24	392.45	7.73	105.73
Relative Buying and Selling Gap between Proposed Prices	RS	1650	0.0227	0.0218	0.0429	0.0035	0.0119
Stock Returns Synchronization	SYN	1650	0.0874	0.0129	2.3582	-1.8751	1.1359

According to Table (3), the results obtained from the correlation coefficient table show that market risk premium, size factor, value factor, momentum factor, profitability factor, accounting quality factor and monthly income growth factor are directly and significantly correlated with portfolio risk premium at 95% confidence level while investment factor and liquidity risk factor are inversely and significantly correlated with portfolio risk premium.

Table (3): Correlation coefficients for variables used in the research (monthly data)

Number	Variable	1	2	3	4	5	6	7	8	9	10
1	R_i-R_f	1									
	Possibility	----									
2	R_m-R_f	0.306	1								
	Possibility	0.000	----								
3	SMB	0.039	-0.208	1							
	Possibility	0.000	0.000	----							
4	HML	0.094	0.063	-0.126	1						
	Possibility	0.000	0.000	0.000	----						
5	WML	0.143	0.287	0.189	-0.175	1					
	Possibility	0.000	0.000	0.000	0.000	----					
6	CMA	-0.024	-0.165	0.064	0.277	0.012	1				
	Possibility	0.0016	0.000	0.000	0.000	0.1034	----				
7	RMW	0.016	-0.046	0.044	0.418	-0.053	0.429	1			
	Possibility	0.0321	0.0000	0.0000	0.0000	0.0000	0.0000	----			
8	LIQ	-0.147	-0.333	0.229	-0.402	0.137	0.043	-0.305	1		

Number	Variable	1	2	3	4	5	6	7	8	9	10
	Possibility	0.000	0.000	0.000	0.000	0.000	0.000	0.000	----		
9	AQF	0.029	-0.001	0.079	-0.123	0.493	0.041	-0.066	0.296	1	
	Possibility	0.001	0.9803	0.000	0.000	0.000	0.000	0.000	0.000	----	
10	LBR	0.019	0.037	-0.008	0.093	0.028	0.091	0.248	-0.284	-0.092	1
	Possibility	0.0081	0.000	0.2717	0.000	0.0001	0.000	0.000	0.000	0.000	----

For instance, according to Table (4), the results obtained from the correlation coefficient table show that the absolute buying and selling gap between proposed prices, the relative buying and selling gap between proposed prices and the stock returns synchronization have direct and significant correlations with portfolio risk premium at 95% confidence level.

Table (4): Correlation coefficients for variables used in the research (annually data)

Number	Variable	1	2	3	4
1	R_i-R_f	1			
	Possibility	----			
2	ABSP	0.121	1		
	Possibility	0.000	----		
3	RS	0.183	0.540	1	
	Possibility	0.000	0.000	----	
4	SYN	0.139	0.185	0.188	1
	Possibility	0.000	0.000	0.000	----

4.2. Estimating portfolio risk premium models and providing a comprehensive portfolio risk premium model

Table (5) summarizes the results obtained by different portfolio risk premium models. As can be seen for Tehran Stock Exchange, Carhart four-factor model has higher explanatory and predictive power than other models presented in Table (5).

Table (5) Summary of results for estimating portfolio risk premium models

Variable	Symbol of Variable	Fama and French three-factor model (2011)		Carhart four-factor model (2014)		Fama - French five-factor model (2014)		Brousseau five-factor model (2015)		Roy and Shijin six-factor model (2018 b)	
		Coefficient	Result	Coefficient	Result	Coefficient	Result	Coefficient	Result	Coefficient	Result
Market Risk Premium	R_m-R_f	0.566610	Significant	0.491908	Significant	0.565210	Significant	0.542508	Significant	**0.565184**	Significant
Size Factor	SMB	0.228852	Significant	0.143570	Significant	0.227642	Significant	0.141668	Significant	**0.228500**	Significant
Value Factor	HML	0.268452	Significant	0.322715	Significant	0.248752	Significant	0.219942	Significant	**0.249058**	Significant
Momentum Factor	WML	----	Significant	0.259999	Significant	----	Significant	----	----	----	----
Investment Factor	CMA	----	----	----	----	-0.036595	Significant	----	----	**-0.036853**	Significant
Profitability Factor	RMW	----	----	----	----	0.061312	Significant	----	----	**0.059265**	Significant
Liquidity Risk Factor	LIQ	----	----	----	----	----	----	-0.162897	Significant	----	----
Accounting Quality Factor	AQF	----	----	----	----	----	----	0.352835	Significant	----	----
Monthly Income Growth Factor	LBR	----	----	----	----	----	----	----	----	**0.013308**	insignificant
adjusted coefficient of determination		0.452		0.483		0.444		0.434		0.444	

At next stage, an optimal model was developed for Tehran Stock Exchange using the stepwise regression technique and considering the factors used in the present portfolio risk premium models whose results have been mentioned above. According to the results of stepwise regression, seven variables were selected as variables affecting the portfolio risk premium. Finally, the ultimate model was estimated based on these seven variables.

According to Table 6, the results of seven-factor model show that the F-probability value (or significance level) is 0.0000. Because this value is less than 0.05, the null hypothesis is rejected at 95% confidence level indicating the model is significant. The Durbin -Watson statistic is 1.999 which indicates that the errors are not auto-correlated. The results of the adjusted coefficient of determination show that approximately 55.7% of the variability in portfolio risk premium is explained by seven factors (including market risk premium factor, size factor, value factor, momentum factor, investment factor, liquidity risk and accounting quality factor). In other words, the explanatory power and predictive ability of the model developed in Tehran Stock Exchange is 55.7% showing its higher explanatory power and predictive ability. Careful study of the coefficients of developed model confirms that market risk premium factor, size factor, value factor, momentum factor and accounting quality factor have significant and positive effects on portfolio risk premium at 95% confidence level while investment factor and liquidity risk factor have a negative and significant effect on portfolio risk premium.

Table (6): Results of final estimation of the portfolio risk premium model according to the selected variables based on the stepwise regression

$R_i - R_f = b_i(R_m - R_f) + s_i(SML) + h_i(HML) + r_i(WML) + c_i(CMA) + l_i(LIQ) + k_i(AQF) + \varepsilon$					
Variable	**Symbol of Variable**	**Estimated Coefficient**	**Standard Error**	**t-Statistic**	Probability
Constant Value	C	-0.001097	0.000506	-2.169043	0.0301
Market Risk Premium	R_m-R_f	0.467469	0.009594	48.72650	0.0000
Size Factor	SMB	0.066712	0.018823	3.544184	0.0004
Value Factor	HML	0.275258	0.013649	20.16729	0.0000
Momentum Factor	WML	0.274255	0.011524	23.79793	0.0000
Investment Factor	CMA	-0.062152	0.011030	-5.634834	0.0000
Liquidity Risk	LIQ	-0.164044	0.018977	-8.644341	0.0000
Accounting Quality Factor	AQF	0.104613	0.017983	5.817179	0.0000
Adjusted Coefficient of Determination					0.557
Durbin- Watson					1.999
F-Statistic					6905.16
Probability (F-Statistic)					0.0000

4.3. Explaining the economic consequences of portfolio risk premium in the Tehran Stock Exchange

According to Table (7), the results of estimation show that the F-probability value (or significance level) is 0.0000. Because this value is less than 0.05, the null hypothesis is rejected at 95% confidence level indicating the model is significant. The Durbin - Watson statistic is 2.148 confirming that the errors are not auto-correlated. The results of the adjusted coefficient of determination show that approximately 57.5% of the variability in absolute buying and selling gap between proposed prices is explained by portfolio risk premium. In general, the results show that the estimated coefficient of portfolio risk premium variable is 8.475470 which indicate the positive effect of portfolio risk premium on the absolute buying and selling gap between proposed prices. Regarding t-statistic, portfolio risk premium variable is significant at 95% confidence level. In other words, it can be said that portfolio risk premium has a positive and significant effect on the absolute buying and selling gap between proposed prices at the 95% confidence level.

Table (7): The results of estimating the first model for economic consequences of portfolio risk premium

Dependent variable: Absolute buying and selling gap between proposed prices Estimation method: Generalized least squares (GLS regression)					
Variable	**Symbol of Variable**	**Estimated Coefficient**	**Standard Error**	**t-Statistic**	Probability
Constant Value	C	95.89474	6.041602	15.87240	0.0000
Portfolio Risk Premium	R_i-R_f	8.475470	1.926830	4.398659	0.0000
Adjusted Coefficient of Determination					0.575
Durbin- Watson					2.148
F-Statistic					1014.58
Probability (F-Statistic)					0.0000

According to Table (8), the results of estimation show that the F-probability value (or significance level) is 0.0000. Because this value is less than 0.05, the null hypothesis is rejected at 95% confidence level indicating the model is significant. The Durbin - Watson statistic is 2.209 confirming that the errors are not auto-correlated. The results of the adjusted coefficient of determination show that approximately 53.7% of the variability in relative buying and selling gap between proposed prices is explained by portfolio risk premium. In general, the results show that the estimated coefficient of portfolio risk premium variable is 0.152631 which indicate the positive effect of portfolio risk premium on the relative buying and selling gap between proposed prices. Regarding t-statistic, portfolio risk premium variable is significant at 95% confidence level. In other words, it can be said that portfolio risk premium has a positive and significant effect on the relative buying and selling gap between proposed prices at the 95% confidence level.

According to Table (9), the results of estimation show that the F-probability value (or significance level) is 0.0000. Because this value is less than 0.05, the null hypothesis is rejected at 95% confidence level indicating the model is significant. The Durbin - Watson statistic is 2.098 confirming that the errors are not auto-correlated. The results of the adjusted coefficient of determination show that approximately 7.7% of the variability in stock returns synchronization is explained by portfolio risk premium. In general, the results show that the estimated coefficient of portfolio risk premium variable is 0.393252 which indicate the positive effect of portfolio risk premium on stock returns synchronization. Regarding t-statistic, portfolio risk premium variable is significant at 95% confidence level. In other words, it can be said that portfolio risk premium has a positive and significant effect on stock returns synchronization at the 95% confidence level.

Table (8): The results of estimating the second model for economic consequences of portfolio risk premium

Dependent variable: The relative buying and selling gap between proposed prices Estimation method: Generalized least squares (GLS regression)					
Variable	**Symbol of Variable**	**Estimated Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
Constant Value	C	0.029041	0.000975	29.79423	0.0000
Portfolio Risk Premium	R_i-R_f	0.152631	0.011283	13.52729	0.0000
Adjusted Coefficient of Determination					0.537
Durbin- Watson					2.209
F-Statistic					869.84
Probability (F-Statistic)					0.0000

Table (9): The results of estimating the third model for economic consequences of portfolio risk premium

Dependent variable: Stock returns synchronization Estimation method: Generalized least squares (GLS regression)					
Variable	**Symbol of Variable**	**Estimated Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
Constant Value	C	0.088606	0.018023	4.916158	0.0000
Portfolio Risk Premium	R_i-R_f	0.393252	0.061347	6.410252	0.0000
Adjusted Coefficient of Determination					0.077
Durbin- Watson					2.098
F-Statistic					63.60
Probability (F-Statistic)					0.0000

5. Conclusions

Lack of explaining a relationship between risk and return and lack of enough knowledge of investors about this issue has facilitated abusing possibility through price manipulation and price bubbles. It can cause huge losses experienced by both investors and capital market in the long term investment periods. Consequently, financing role of the market may be weakened. Capital Asset Pricing Model (CAPM) predicts the expected returns by measuring the systematic risk of each asset. Developing these models enables optimal allocation of resources in the financial system leading to an optimal portfolio regarding desired degree of risk-taking. Pricing of capital assets, especially stocks is one of the most important issues with which investors and activists are faced in the capital market during investing in these securities. CAPM is a common method to price stock. The development of this model has been considered in the literature and scientific foundations of financial management. This study aims to test the ability of existing models to assess portfolio risk premium and to provide an appropriate model for portfolio risk premium assessment and explaining the consequences of portfolio risk premium in the Iranian reporting environment. By analyzing the information related to 150 companies listed in Tehran Stock Exchange during 2007 to 2017, research findings show that Carhart four-factor model has higher predictive ability (48.3%) than other mentioned models in Tehran Stock Exchange. The results of this hypothesis are consistent with the findings of Carhart (2014) and Kian (2015). Therefore, actual, potential investors and other stakeholders are advised to pay more attention to the Carhart four-factor model to include it in their decision-making polices because the factors of this model can be a good basis for their investment decisions. According to the results of stepwise regression, seven variables have been selected as variables affecting portfolio risk premium. The explanatory power and predictive ability of the model developed in the Tehran Stock Exchange was 55.7% indicating higher predictive ability respect to previous models on portfolio risk premium. Careful study of the coefficients of developed model confirms that market risk premium factor, size factor, value factor, momentum factor and accounting quality factor have significant and positive effects on portfolio risk premium at 95% confidence level while investment factor and liquidity risk factor have a negative and significant effect on portfolio risk premium. The results of this hypothesis are in agreement with those of Roy and Shijin (2018) study. In other words, market risk premium factor, size factor, value factor, momentum factor and accounting quality factor can be considered as factors which increase the portfolio risk premium. Therefore, actual and potential investors are advised to pay more attention to these factors and include them in their decision-making models as they can be very effective in their economic decisions. The economic consequences of portfolio risk premium shows that portfolio risk premium has a positive and significant effect on both absolute and relative buying and selling gap between proposed prices and stock returns synchronization. The results of this hypothesis are in parallel with the findings of Brousseau (2015) and Roy and Shijin (2018).

According to the results of Fama-French five-factor model compared to those of four-factor and six-factor models in explaining the stock return volatilities, investors and managers of investment companies are advised to use the five-factor model to evaluate their portfolio performance. Investors should consider the continuity and price returns during buying and selling stocks to get more profit or to avoid more losses. When they are preparing a portfolio, it is

essential to pay more attention to the size factor, the ratio of book value to market value and the trading volume of companies. Also, companies should move towards market efficiency to make prices more realistic by calculating and reporting the intrinsic values of stocks so that investors (especially non-professional investors) are able to recognize and compare current prices with their intrinsic values. Regarding risk and expected return assessment, optimal portfolio and similar decisions, the results of present study can be used by investors, creditors, stock exchange brokers, managers of company listed in stock exchange and intra- organizational and inter-organizational users and the results of this research can be a good platform to conduct future researches in this field for other educational and research centers. It is also suggested that the role of financial reporting quality on the interaction between portfolio risk premium and rate of stock price adjustment should be examined at the industry level in the future studies considering all indicators of measuring financial reporting quality and rate of stock price adjustment.

References

1) Bali, T. G., Cakici, N., and Whitelaw, R.F. (2011). Maxing out: Stocks as lotteries and the cross-section of expected returns. Journal of Financial Economics, 99 (2), 427- 446.
2) Brousseau, C. (2015). The Pricing of Liquidity Risk and Accounting Quality in Canada. Journal of Accounting and Finance Research, 4 (4), 127-139.
3) Butler M., Leone, A. J., and Willenborg, M. (2004). An empirical analysis of auditor reporting and its association with abnormal accruals. Journal of Accounting and Economics, 37 (2), 139-165.
4) Campbell, J., Hilscher, J., and Szilagyi, J. (2008). In Search of Distress Risk. Journal of Finance, 63(6), 2899-2939.
5) Carhart, M. M. (2014). On Persistence in Mutual Fund Performance. Journal of Finance, 52(1), 57-82.
6) Fama E. F., and French. A. (1993). Common Risk Factors in the Returns on Stocks and Bonds. Journal of Financial Economics, 33(1) 3-56.
7) Fama, E. F., and French, K. R. (2011). Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? Journal of Financial economics, 60 (1), 3-43.
8) Fama, E. F., and French, K. R. (2014). Incremental variables and the investment opportunity set. Journal of Financial Economics, 117(3), 470-488.
9) Fama, E. F., French, K. R. (2015). A five-factor asset pricing model. Journal of Financial Economics, 116(1), 1-22.
10) Fraz, A. (2017). Information Environment Quality and its Impact on Return and Investment Decision, Doctor of Philosophy in Management Sciences, Department of Management & Social Sciences, Capital University of Science & Technology, Islamabad.
11) Islami Bidgoli. G. R., and Shahsavani D. (2012). Evaluation of the ability of the model based on stock characteristics in comparison with Fama and French three-factor model in explaining the stock returns of companies listed in the Tehran Stock Exchange. Journal of Accounting and Auditing Research, 4(21), 4-13.
12) Izadinia, N., Ebrahimi, M., and Hajiannejad A. (2014). Comparison of Fama - French Main Three-Factor Model with Carhart Main Four-Factor Model in Explaining the Stock Return of Companies Listed in the Tehran Stock Exchange. Journal of Asset Management and Financing, 2(3), 17-28.
13) Jegadeesh N., and Titman.S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. Journal of Financial, 48 (1), 65-91.
14) McNichols, M. (2002). The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors: Discussion. Journal of Accounting Review, 77, 61-69.
15) Roy. R., and Shijin. S. (2018 a). Dissecting anomalies and dynamic human capital: The global evidence. Journal of Borsa Istanbul Review, 18(1), 1-32.
16) Roy. R., and Shijin. S. (2018 b). A six-factor asset pricing model. Journal of Borsa Istanbul Review 18 (3), 205-217.
17) Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. Journal of Finance, 19 (3), 425–442.
18) Sheri, S., and Aghazarian, N. (2007). Empirical testing the power of the Fama and French model in explaining stock returns on Tehran stock exchange. Journal of Empirical studies of accounting, No.19, 115-134.

19) Sloan, R. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? Journal of Accounting Review, 71(3), 289-315.
20) Yang, S., and Zhang, Q. (2009). Noise trading, investor sentiment volatility and stock returns. Journal of Systems Engineering - Theory & Practice, 29 (3), 40-47.